Claim Amendments

1-14. Canceled

15. (new) A method for optically interconnecting a plurality of processing units via wavelength division multiplexing comprising the steps of:

optically encoding messages among said plurality of processing units using a shared free space optical beamline with multiple individual sub-channels each having a different wavelength;

the beamline contained entirely within a conduit connecting first and second hubs;

transmitting by transmit probes within the conduit associated with respective processing units a sub-channel over said shared beamline;

receiving a portion of the wavelength division multiplexed beamline by respective receive probes within the conduit associated with respective processing units, the receive probes disposed in a helical arrangement along said beamline within the conduit; and

recovering said message transmissions at the first and second hubs by respective wavelength selective receivers associated with the various processing units where the message transmissions are carried by the different wavelengths of the beamline.

16. (new) The method of claim 15 further comprising allocating, for each of the plurality of processing units, one or more sub-channels selected from a first group and one or more sub-channels selected from a second group.

17. (new) The method of claim 16 wherein the step of allocating comprises dynamically allocating sub-channels from the first and second groups according to load conditions.

18. (new) The method of claim 17 wherein the step of allocating comprises:
allocating, to each individual processing unit, a first transmit channel selected from the first group and a first receive channel selected from the second group;

allocating a second transmit channel from the first group if a transmit queue associated with the first transmit channel of a processing unit exceeds a threshold; and

allocating a second receive channel from the second group if a receive queue associated with the first receive channel of a processing unit exceeds a threshold.

19. (new) The method of claim 18 further comprising:

de-allocating the second transmit channel associated with a processing unit if a total transmit load of the processing unit falls below the threshold of a single channel; and

de-allocating the second receive channel associated with a processing unit if a total receive load of the processing unit falls below the threshold of a single channel.

20. (new) A system for optically interconnecting first and second hubs comprising:

processing units intermediate the first and second hubs adapted to communicate messages;

the first and second hubs adapted to optically encode the messages using a shared free space optical beamline onto multiple individual sub-channels each having a different wavelength;

a conduit connecting the first and second hubs;

a plurality of transmit probes associated with respective processing units are distributed within the conduit and originate messages, the transmit probes each configured to generate individual messages of selected wavelengths, yielding a plurality of message transmissions having different wavelengths that are transmitted towards one of the first and second hubs;

wavelength selective transmitters at the first and second hubs transmit said message transmissions that are carried by the different wavelengths in the beamline;

a plurality of receive probes associated with respective processing units are disposed in a helical arrangement along said beamline within the conduit and receive a portion of the wavelength division multiplexed beamline coming from one of the first and second hubs; and

wavelength selective receivers at the first and second hubs recover said message transmissions that are carried by the different wavelengths originated from the transmit probes.

21. (new) A system according to claim 20 further including means for dynamic wavelength allocation and de-allocation responsive to system load.